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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,265	02/20/2004	Yoji Maeda	JP920020215US1	2264
24241 7590 04/18/2007 IBM MICROELECTRONICS INTELLECTUAL PROPERTY LAW 1000 RIVER STREET 972 E ESSEX JUNCTION, VT 05452			EXAMINER ELVE, MARIA ALEXANDRA	
			ART UNIT 1725	PAPER NUMBER
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		04/18/2007	PAPER	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/708,265	<b>Applicant(s)</b> MAEDA ET AL.	
	<b>Examiner</b> M. Alexandra Elve	<b>Art Unit</b> 1725	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 02 February 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3 & 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Gagosz et al. (USPN 5,037,183).

Gagosz et al. discloses laser drilling a plurality of holes. A rotatable mirror (turning mirror) and a galvanometer scanner (turning mirror) controllably directs the beam (of a pulsed laser) to a focusing lens (plano convex lens). The distance between the mirror and lens determines if parallel, divergent or convergent holes are drilled. One focal length yields parallel holes. Less than one focal length yields divergent holes and greater than one focal length yields convergent holes. If the cooling holes of a turbine are laser drilled, the holes are parallel to each other and have a continuous diameter of 0.6mm. In addition, the angle with respect to the axis of the lens may be changed such that the beam is focused in an alternate location. Thus multiple holes may be drilled.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

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the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 4-5 & 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gagosz et al. as stated above and further in view of Schultz et al. (USPAP 2002/0096501).

Gagosz et al. does not teach the angle of the laser with respect to the central axis.

Schultz et al. discloses the piercing using a laser. The laser beam is focused at an incident angle (0 to 10°). This may vary depending on the geometry and character of the material being processed.

It would have been obvious to one of ordinary skill in the art at the time of the invention to determine the angle of the beam relative to the axis, as taught by Schultz et al. in the Gagosz et al. process because this is merely a measurement of the operational parameters and ensures the formation of a quality drilled product.

Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hiramatsu (USPAP 2004/0222197 A1) in view of Gagosz et al.

Hiramatsu discloses a laser system for forming via holes in a substrate. A CO<sub>2</sub> laser oscillator generates a laser beam, which is, passes through a condenser lens (92), a collimator lens (90) and a transfer mask (62). The beam is then positioned by galvano-mirrors (74X & 74Y), which are connected to angle adjustment motors (72X & 72Y) and finally passed through an f-theta lens (76) before impinging on the substrate. The substrate is mounted on a X-Y table (80), which may be moved relative to the laser

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head. Additionally, the system has a target mask (211), which may be placed on the substrate. The mask may be used to alter the diameter of the laser beam. (abstract, figures, 0027, 0043, 0056, 0060, 0062, 0066, 0068, 0095, 0111, 0112, 0133-0139, 0142, 0144-0145, 0153-0163, 0178-0181, 0187, 0197, 0207-0210, 0220, 0223, 0227-0228)

The f-theta lens is not a true condenser lens, although it is known for linearity effects. Substitution of known equivalent structures, in this case, an f-theta lens for a condensing lens is well known in the art. In re Ruff 118 USPQ 343 (CCPA 1959). In addition, the use of a condenser lens (92) is taught and is present in the apparatus set up. The reversal of parts was held to have been obvious. In re Gazda 104 USPQ 400. The rearrangement of parts was held to have been obvious. In re Japikse 86 USPQ 70.

The f-theta lens may be substituted with a plano-convex lens as taught by Gagosz et al. and thus forming parallel, divergent or convergent holes. It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute a condenser, f-theta or plano-convex lens because these are common lens in laser systems, which are used interchangeably.

### ***Response to Arguments***

Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

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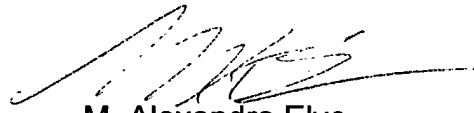
***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Alexandra Elve whose telephone number is 571-272-1173. The examiner can normally be reached on 6:30-3:00 Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

April 14, 2007.

  
M. Alexandra Elve  
Primary Examiner 1725